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JOHN F. CUNNINGHAM, - - - - Editor.
W. D. GIBBS, - - - - Business Manager

STAFF.

F. S. JOHNSTON. C. B. STEWART
M. IMES. L. C. WARDEN.
V. H. DAVIS.

EDITORIAL ETCHINGS.

The November issue of the Agricultural Student contained a notice of the dedication of the new Dairy and Biological building at the New York Experiment Station at Geneva, N. Y. This building has been erected at a cost of \$41,000, and is one of the first and best equipped buildings of its kind in this country. We take pleasure in presenting a cut of this structure on our frontispiece this issue. This cut was kindly loaned by the New York Experiment Station.

During the past year there has been a great change in athletic affairs about the Ohio State University. For some time the authorities of the institution have insisted upon "clean" athletics in the strictest sense of the term, and while it seems that such a sudden enforcement of laws that should be obeyed has been more or less disastrous to our college athletics, we cannot but agree that it is a step in the right direction.

This fall our foot ball team has been composed of men who are full-fledged college students, who are not here to play foot ball, but who make it a side issue—in other words, who are bona fide students of the University. Our defeats upon the gridiron have been more numerous, perhaps, than they might have been had we played men regardless

of their standing in college, but we have the satisfaction of knowing that what we have won and lost we have won and lost honorably, and that it is far more manly to do our best honorably and lose than to win through dishonorable or underhanded methods. True sportsmanship lies not in playing for the sole purpose of winning games. Of course each team should exert every effort to win, but in the end the play is for the sake of the game itself rather than to down our opponents. We should be able to appreciate good work on the part of the opposing team as well as that of our own.

As was stated above, the work of purifying athletics at the Ohio State University is certainly a step in the right direction, and doubtless the other colleges of the state will soon see the justice of the movement. When we know that the contest will be between two representative college teams the interest will surely increase rather than decrease, and "ringers" will be a thing of the past.

For some time the Ohio State University has been noted for the large number of college clubs and societies it possesses, and to these organizations may be extended the credit for many advantages which the University may possess. With all the different societies for study and culture, however, there has never been (for some time at least) one devoted exclusively to the study and discussion of

topics distinctly horticultural and agricultural. Recognizing the need of such a club, and appreciating the advantages it would possess for those who might be interested, a couple of young men have started a novel and interesting movement which concerns those who are particularly interested in horticulture and its kindred branches. This club is novel in that it has no constitution, no by-laws, no dues, no officers, and no rules, except a few unwritten agreements of the members in regard to the general conduct of the affairs of the club. Informality is the distinguishing feature, and everyone counts for what he is worth. The name agreed upon at the first meeting is rather characteristic, and one which may have several meanings, and which at the same time typifies several branches of horticulture; it is called the Asparagus Club.

The club meets on every Tuesday evening at 6:30 o'clock in the Reading Room in Horticultural Hall, and the meeting lasts for one hour.

One of the main objects of the club is to keep abreast of the times by having some member report the news for the week at each meeting.

If nothing more than a general knowledge of what is going on in the horticultural world could be derived from the existence of the club, it would be well worth its existence.

Beside the news that is reported at every meeting, the leader of the meeting appoints someone to discuss some horticultural subject. This leader, by the way, is appointed at each meeting for the following meeting, and he suits his own tastes in arranging the program for his meeting. One of the pleasant features of the club is the liberty on the part of those present to conduct themselves as they like, and to make themselves comfortable during the meeting. Also, when a fruit is being discussed, for instance, specimens of that fruit are on hand and may be sampled during the discussion. This not only removes any

formality and stiffness that the meeting may possess, but puts all of those present in a talkative mood. Altogether it is thought that the club will be of great value to the students in horticulture, and be a pleasure as well.

Townshend Literary Society now stands among the regular literary societies of the University. This society was formerly a technical society, devoted to the study and discussion of subjects that were distinctly agricultural. From this it was changed somewhat by making it a literary society, but limiting its membership to students of the College of Agriculture and Domestic Science. The constitution of the society now makes it a regular literary society, and allows any one to join it whom the members see fit to admit to membership. By this step it is removed from the class known as technical societies and placed among the distinct literary societies. It is represented upon the Lantern and the Makio, and is in every way the most prosperous society in the University. A review of its history will show that not only has it been prominent in general college work, but, as an organization it has been public spirited in many ways. Among many possible examples might be mentioned the fact that during the revival of athletics in the University last year Townshend gave more toward the subscription than any other organization, with the exception of the Glee Club.

We give considerable space in this issue to the course in dairying of the College of Agriculture and Domestic Science. The fifth session of this course begins Wednesday, January 4, 1899, and continues ten weeks. This course has been increasingly successful year by year and deservedly so. The equipment for the work has been the wonder and admiration of all who have seen it. The laboratory or practical work is in the

hands of instructors who are experts in their several lines and who are thoroughly practical and successful men. The class room work is given almost exclusively by full professors or members of the faculty. In other words, it is the attempt to make the instruction in all its branches as thorough and of as high an order as possible. As a result of this sort of training the men who have received it have been more than usually successful.

In our last issue we published an illustration of the buttermaking room of the dairy laboratory. The laboratory proper may be said to consist of the butter-making room, the cheese-making room, two curing rooms, the pasteurizing, sterilizing and milk-bottling room and the boiler and engine room, together with several less important rooms. The boiler and engine room shown on page 66 is detached from Townshend Hall and contains besides boiler and engine for power, the compressor, condenser and engines of the refrigerating apparatus. Experience has shown that creamery operators must have thorough and practical training in the management and care of boiler and engine as well as making butter, testing milk and similar operations. Every student is required to operate the engines and condenser and fire the boiler under the guidance of a competent instructor in addition to receiving lectures upon the care of steam engines and boilers.

Lectures upon the judging of cattle are given in the livestock judging room shown on page 67, and the students are required to familiarize themselves with the points of a dairy animal by scoring animals of different breeds which are brought into this room for the purpose.

Instruction on bacteriology with special reference to milk, butter and cheese, is given by the department of physiology in the new Biological building. One of the laboratories of this department is

shown on page 68. The facilities for instruction in bacteriology are very complete.

It may interest some to know how the student spends his time while taking the course in dairying. The work begins at eight o'clock in the morning and closes at four o'clock in the afternoon. During the four morning hours the students are at work in the laboratory doing practical work. Some are running separators, some are churning butter, some are working butter, some are testing milk, some are bottling milk, some are pasteurizing milk, others are making cheese, while others are managing the boiler, the engines and the condenser, while all have experience in getting and keeping things clean—an extremely important lesson. Of course the students are changed about from day to day so that each becomes familiar with all operations. Forty or fifty earnest and energetic students dressed in their white duck suits make an attractive and inspiring sight. Indeed it is such an attraction that the problem of visitors has become a serious one.

In the afternoons from one to three o'clock the students listen to lectures or come prepared to recite the lessons that have been assigned them in their textbooks. There are lectures and recitations on butter and cheese making, testing and pasteurizing of milk, on the chemistry of milk, butter and cheese; on the care of steam engine and boiler, on the diseases of cattle, on the breeds of dairy cattle and on the principles of feeding and breeding of cattle. On Friday forenoons instead of having work in the dairy laboratory the students judge cattle or spend their time in calculating feeding rations.

Agriculture is the oldest of the arts, and is the basis of all production.

Ohio State Horticultural Society.

In response to an urgent invitation from the Eastern Cuyahoga Horticultural Society and the citizens of that section of the state, the thirty-second annual convention of the Ohio State Horticultural Society will be held at Euclid, O., December 7, 8 and 9, 1898. Arrangements have been made that parties of ten or more starting from the same station may secure special rates on the railroads.

The "Euclid Inn," a fine, new hotel, will accommodate those who wish to stop there, and will be the society headquarters.

Among the speakers we notice several who are quite prominent in horticultural work. W. J. Green, F. H. Hale, of Connecticut; Wm. Miller, of Gypsum; A. D. Selby, W. W. Farnsworth, F. M. Webster, W. R. Lazenby and L. H. Read are upon the program, besides others.

The Dairy-School Graduate.

"Did it ever occur to you that a large percentage of prize winning buttermakers are dairy school graduates," asked a prominent dealer recently. "I have been reading in your paper during the past few weeks the names and scores of prize winning buttermakers at the various state fairs, and I have been struck with the excellent results shown by the large number of dairy school graduates who have secured high scorings. It is true, of course, that there are buttermakers doing fine work who never have attended a dairy school, but the road to success in the art of buttermaking is shorter and surer through the dairy school than any other I know.

"I remember a few years ago, during one of my western trips, a young buttermaker's helper that talked to me about his work and said he was very anxious to succeed in his chosen profession, and wanted to know if I couldn't give him

some advice, so that he might progress more rapidly in his work. I liked the frank manner of the boy, as well as his enthusiasm, and told him to finish the season where he was and then if possible take a course at least, in his state dairy school. 'You will then not only have a scientific knowledge of butter-making,' I said, 'but considerable practical knowledge as well. Those two combined will lead you along the road to success much faster than you will travel if you only obtain a practical knowledge of the art.' That young man took my advice and is today a high class buttermaker. It is my opinion that the time is not far distant when dairy schools of this country will graduate all our fancy buttermakers."—By Man of the Street in New York Produce Review and American Creamery.

Work of Dairy Schools.

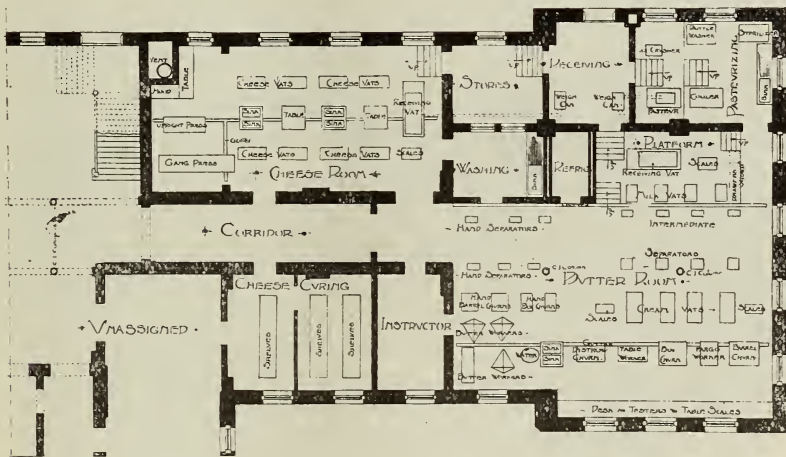
The benefits of a dairy course are so many that only a part of them can be mentioned here. The chief advantage of any kind of education is that it trains one to think. Dairymen should know why, as well as how, and the one who understands the reasons for each of the steps in making dairy products is the one who most successfully meets unexpected and unfavorable conditions when they occur. Good operators who can think and who possess some original resources are wanted by creamery and cheese factory managers. The latter are not slow to learn that an employe, understanding practical dairy work and capable of sound reasoning, is worth much more than the one who acts mechanically. If the skim-milk or whey can be made to test one-tenth per cent. less in butter fat, they want the man who can do it. There is a demand for good dairymen, and it is doubtful if many up-to-date buttermakers or cheese-makers can be found in the army of "educated unemployed"; such men are needed in too many places.

The best students from the dairy schools are usually successful in securing first-class positions; in fact, the schools are sometimes unable to fill all the positions referred to them because of the lack of candidates.

Another benefit of special dairy training is, it makes one more independent. It frequently happens that the profits from a dairy concern can be much increased by changing the kind of product. If the butter market is depressed, it may be well to manufacture cheese for a time, or if the milk market is flooded, it will very likely be advantageous to the shipper or the dealer to make butter or cheese for a few days until normal conditions of the market are resumed. This

alike except in minor particulars, may be equally good, they do not sell as well on the market as they would if more alike. When the makers in any section have been trained to ripen their cream in the same way, churn it at the same stage, use salt and color in the same degree, and pack the product in the same way, material benefits will accrue to all the creameries in that community.

From a financial standpoint a short dairy course may be regarded by an ambitious person who is much interested in dairying as a good investment. Many earnest men and women, limited in both time and money, have been able to help themselves very considerably by making the most of a few weeks at a dairy school.



Floor Plan of Dairy Laboratory. Ohio Dairy School

matter of being able to change at the right time may save many dollars' worth of milk which would otherwise be a total loss.

A great advantage of dairy schools is that they teach the same methods to all students, and in this way have much influence in making dairy products more uniform. Butter and cheese have been justly criticised for lack of this quality, but greater uniformity is already noticed as the result of dairy school training. Though several different lots of butter,

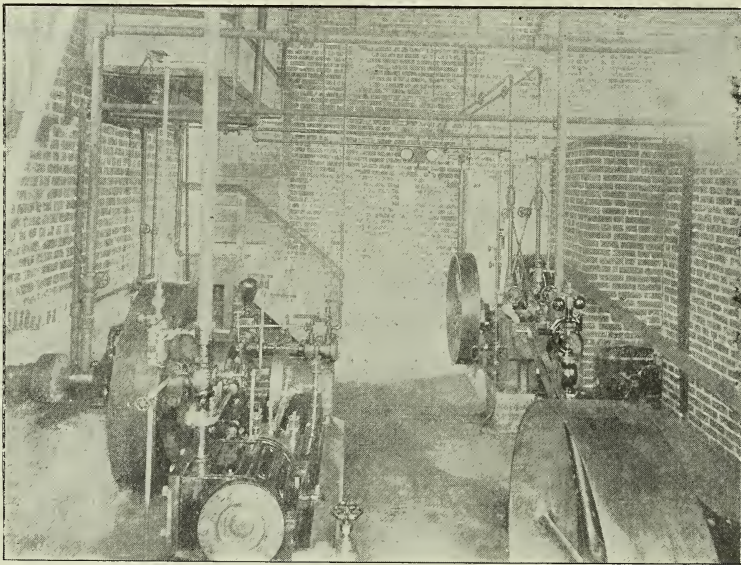
It must be remembered tact and skill and keen interest in the work are necessary; without these the manager of a new and promising dairy enterprise may ruin it, but with them an ordinary place may be made to prosper and be a source of great profit to the community. Many run-down and struggling creameries are scattered through the country: often their unprosperous condition is due to a small supply of milk—this is beyond the control of the operator. But the trouble is sometimes in the factory itself, and in

such a case an intelligent, energetic operator is usually the one thing needed.

A few cases may be cited showing how dairy schools have benefited individuals. A young man who had spent all his life at ordinary farm work and had very little knowledge of dairy methods, took a ten weeks' creameryman's course and at its close obtained a position in a creamery paying \$50 a month for ten months in the year. Before taking the course he had been getting \$25 about eight months each year. Fifty dollars covered his entire expense at the school and by the outlay of this amount he more than doubled his income. The next winter he returned to the dairy school, heard the lectures a second time, repeated a

A young man who had just finished school attended a three months' dairy course at a total cost of nearly \$75. The next summer he took full charge of a creamery receiving 12,000 pounds of milk a day, and besides making the butter, kept the books and apportioned payments on the basis of fat delivered. His butter was awarded both first and second premiums in a close contest at the county fair. He was paid \$65 a month. The next year he took full charge of a large creamery producing almost a ton of butter a day, and had three assistants—salary \$80 per month.

Dairying has recently come to be regarded as the most profitable branch of agriculture in many localities where



Boiler Room, containing Power and Refrigerating Apparatus. Ohio Dairy School.

part of the work, and took some advanced study. He then secured a position which paid him \$55 per month, with house rent free. The creamery of which this young man has charge has a neat, tidy appearance, and the beginning of this improvement was a determination to excel in dairy work, and the first act was to attend a short dairy course which cost, in all, about \$50.

grain raising or general farming had been the leading occupation, and farmers have been compelled to give their chief attention to their herds. Those who have not been in the business long, or have never put their best efforts into it, little appreciate the great losses due to poor methods in feeding, selecting and caring for stock and preparing the product for market. It has been shown repeatedly that one cow may easily pro-

duce twice the butter of another, making her profit more than double the profit from the poor cow. The lectures and practical work on selecting, judging and managing stock give valuable instruction on these matters. It is claimed that the fat which remains in the skim-milk and buttermilk on farms would increase the yield of farm dairy butter 25 per cent. if it could be saved. Nearly all of this can be saved by the careful practice of modern methods.—R. Pearson, U. S. Dept. of Agriculture.

While many people dread the expense of such a building, they do not realize how simple and easily a cold storage can be built. In order to overcome this objection, I will endeavor to explain the construction of one which we find to fulfill the purpose in every case, one which is convenient as well as cheap.

First, estimate the size and shape of storage needed. For outside partitions set up 2x2 inch hemlock studding 6 feet long, 2 feet apart, on a thick cement or ground foundation. Then nail one-half



Live Stock Lecture Room. Ohio State University.

How to Build a Cold Storage House.

Most people in the country are in need of cold storage. Although many may have good facilities, still they do not appreciate the convenience and profit they would derive from it. Every horticulturist and especially every dairy man ought to have such a convenience. The horticulturist can store his perishable products and wait for a better market, while the dairy man can improve his products 50 per cent. Besides this, cold storage will give him an equal opportunity for waiting until the demand is greater.

inch rough boards on both sides of these studdings.

The boards must be covered with thick felting paper and the joints of this should overlap and be well tacked in order to make it air tight. The outside of this partition should now be sided with matched siding, and on the inside nail another row of studding at the same distance apart, but alternately with the first row. This must again be sided with rough boards, covered with felted paper in the same manner as before. Repeat this operation, nailing these studding alternately with the second row, and using

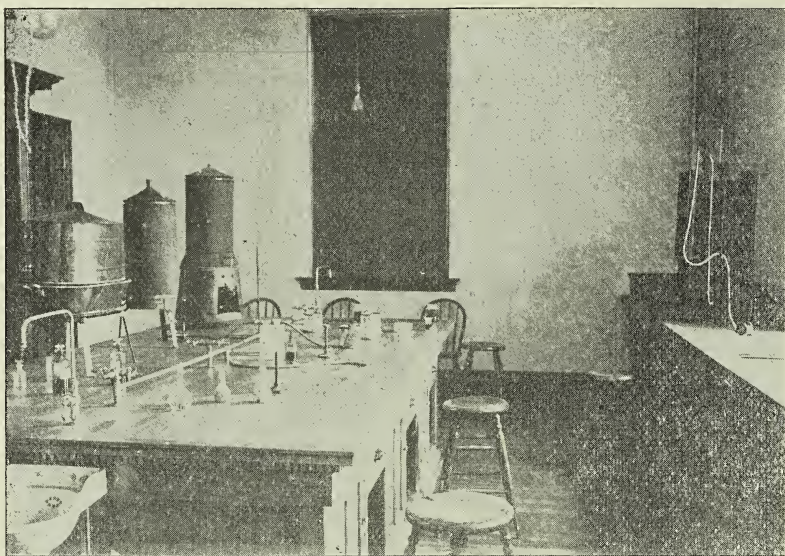
one-inch board instead of one-half inch this time.

Then cover the paper with another set of tight jointed boards. This leaves three dead air spaces, and as air is considered one of the best non-conductors, it makes almost an impenetrable wall for heat and cold.

The ceiling must be made similarly except that it should be provided with a roof instead of the siding. The doors should have beveled ends, well fitted, and packed with canvas at the edges. The

a lattice made of 2 by 2 timber must be fitted, on which the ice is placed. This really represents a two-story building, the upper part intended for ice, the lower part used for storage rooms, for the reason that cold air is heaviest and always settles to the bottom.

A drain pipe not less than 3 inches in diameter should be attached to the iron at the draining point, and arranged so that the drip water may be conveyed into a trough for other cooling purposes or directly into a tile drain.



Bacteriological Laboratory. Ohio State University.

entrance into storage room should be arranged with two doors and a small hallway in order to exclude the warm air from rushing in when going in and out. Six feet from the base on the inside, enter the ends of 2 by 8 inch joist, every foot throughout the building into the first thickness of the partition. Run a 6 by 6 inch sill every 8 feet crossways beneath the joist and face this sill every 6 or 7 feet with a 6 by 6 inch post resting on a good foundation.

Over the joist lay a floor of galvanized iron well soldered in order to prevent leaking. Care should be taken to lay it on a slope for the purpose of draining the waste water. On this floor

This completes the building. This is the time to consider such matters, before winter sets in.

We hope to see more of our horticulturists as well as dairy men take advantage of such conveniences. O. E.

Adam, the first man, was a farmer. Is it any wonder that the farmer of today, following in the footsteps of his primitive ancestor, should be the first man in modern civilization?

"Give us this day our daily bread" has probably been uttered as often as any plea that man has devised. It is through the agricultural vocation that this prayer is answered.

A Leaf-Hopper Destructive to Wheat.

The wheat fields in the vicinity of Columbus are at present swarming with small leaf-hoppers, the most conspicuous species being the Hurtful Leaf-hopper (*Deltocephalus inimicus*). This species has been recognized as a destructive form since the time of its first description, when its character was indicated in its name, but it is not given the attention which its power for injury would seem to deserve.

The adult insect, the form now most abundant, is about three-sixteenths of an inch long, the color grayish, with brownish markings and six black dots—two on the front of the head, two on the prothorax, and two on the scutellum.

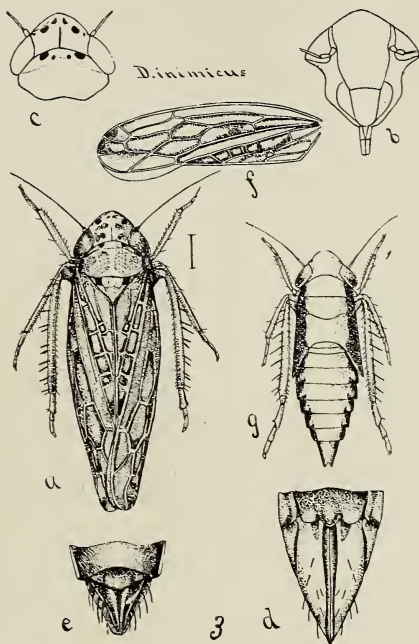
The larval forms are yellow, and after the first two moults are distinguished by the presence of a conspicuous black margin from the eyes back.

Both larvæ and adults are concerned in the injuries, and their mode of attack is to puncture the leaves and stems and suck the sap, thereby causing wilted and deadened spots and the weakening of the plant, especially above the point where the punctures are made. According to the first record concerning the insect—that accompanying the original description—the larva attacks the roots. Say remarks: "When in the larva state, this species is said to depredate on the roots of wheat. Several specimens were sent me by Professor Green in the year 1822, who received them from a farmer in Virginia." This would be a rather exceptional method of feeding for a member of this family, and as the observation has, I think, never been verified, it may be questioned whether some other form was not observed on the roots while the adults were found on the plants above ground.

The insect is probably primarily a grass-feeding species, as it occurs in great abundance in blue-grass, as well as upon a variety of other grasses, where it feeds the year through, but its abundance in wheat fields in autumn shows

that it finds in the young plants a very attractive food.

In blue-grass there are two distinct broods each year, the larvæ of the first brood appearing in May and maturing



by the middle of June. Adults begin to appear early in June and are found until the middle of July, while the second brood of larvæ appear by the middle of July and are mostly mature by the latter part of August, the adults of the second brood occurring from the middle of August on through September and October. While it is possible there may be a greater number of brood under favorable circumstances, these are all that have been determined with certainty. Adults are often found till late in autumn, or even as late as early winter, but not in spring, and it appears that the eggs are deposited in late fall, but precise observations on this point are still needed.

While this insect does not occur in such enormous numbers and with such conspicuous damage as the chinch-bug, its work is of the same character, and there can be no question as to the effect of its sapping the plants, but, like the

chinch-bug, it is a difficult insect to treat. So far as wheat is concerned, it will doubtless be of some service to select fields as remote as possible from pastures or meadows, from which the leaf-hoppers probably migrate. For direct treatment the only feasible plan is the capture of the hoppers on tar-pans, and the trouble and expense involved in this may be too great for its profitable application except in fields very badly infested. This method consists in the drawing of a long strip of sheet-iron, the upper surface of which is coated with coal tar, over the field, the hoppers as they jump up, on being disturbed, falling on the pan and adhering to the tar. By this method hoppers have been taken in grass land at the rate of half a million to the acre, and the capture of this number must mean a considerable reduction in the injury to plants.

HERBERT OSBORN.

Columbus, O., Oct. 22, 1898.

Observations on the Food of Two of Our Common Birds.

Too much cannot be said in favor of some of our common birds. Often their natural connection with injurious species causes certain ones to be looked upon with suspicion and killed wherever found by our farmers who rightfully desire to protect their poultry and crops against the various destructive agencies that are continually confronting them.

Two specimens of the Long-eared Owl, *Asio wilsonianus*, were recently procured by the Department of Zoology and Entomology. They were taken in a woods two miles north of Columbus, where they had, in all probability, located for the winter. A study of their stomach contents emphasizes the statement made by "Hawks and Owls": "This owl is pre-eminently a mouser," for wrapped in large pellets of hair were the bony remains of no less than 8 mice, apparently of one species, the common house mouse, *Mus musculus*.

One stomach contained five skulls and the other three. We have no means of knowing how often these owls fed, but suppose they killed eight mice every day we could easily calculate the number they would destroy in a month or even during the winter. To get an idea of the food in general of this species I take pleasure in quoting again from "Hawks and Owls": An examination of fifty or more cast-up pellets revealed 176 skulls or parts of skulls of the following species: Ninety-five meadow mice, 19 pine mice, 15 house mice, 5 white-footed mice, 3 Cooper's mice, 23 little short-tailed shrews and 3 short-tailed shrews. Also 13 birds, of which 11 were sparrows, one a blue bird and the other a warbler. This shows that its food in this case at least consisted almost exclusively of injurious rodents and seed-eating birds. Similar results have been obtained by us and by a great many other observers, so we must consider the long-eared owl a beneficial species. While we are speaking in favor of this species we are not forgetting the screech owl, the short-eared owl, the barn owl, in fact any of our smaller owls.

The yellow-billed cuckoo, *Coccyzus americanus*, is another common bird from which agriculturists realize a great many benefits. It is among the few species that feed upon hairy caterpillars. To emphasize the statement we can safely say that this bird not only eats these caterpillars, but it seems, has developed a special liking for them. Thus the tent caterpillar, the larva of the tussock moth and the canker worm form a large per cent. of its food in seasons when these insects are doing injury to our fruit and shade trees. A specimen of this bird taken on the University grounds late in October, showed by the hairy coating of its stomach that it had destroyed innumerable hairy caterpillars during the past summer. Its stomach contained at the time six full grown insects commonly called grasshoppers. These were of two species, the differential locust,

Melanoplus differentialis, and the meadow grasshopper, *Xiphidium vulgare*, three specimens of each.

J. S. HINE.

Testing Soil for Application of Commercial Fertilizers.

As already mentioned in these columns, the Department of Agricultural Chemistry has undertaken the testing of soils at the Ohio State University for the benefit of farmers desiring to use commercial fertilizers upon their fields. Circulars have been sent out giving full instructions for collecting and shipment of a sufficient quantity of soil for making the test. A number of samples have been received, and the following report of the beginning of the work may be of interest:

SOIL TEST NO. 1.

This soil was sent by Mr. F. F. Neil, Jr., of Venice, Ohio. It consisted of black muck, and was employed for the production of celery. As muck soil is usually deficient in all ingredients of plant food, with the exception of iron, nitrogen and sulphates, the test was made more in detail than would be necessary with ordinary heavy soils, which are only partially exhausted.

The soil was thoroughly mixed and six plots of about ten pounds each were prepared in the following manner:

Ordinary six-inch drain tiles were surrounded with sand to the top and the tiles themselves were filled with sand to within seven inches of the top. The sand was thoroughly drenched with water and seven inches of soil introduced on the sand in each tile. The plots thus prepared were six in number and were fertilized in the following manner, the fertilizer in each plot being thoroughly mixed with the upper part of the soil:

PLOT NO. 1.

Sodium nitrate.....	8 grains
Superphosphate..	16 "
Magnesium sulphate.....	8 "
Potassium sulphate.....	8 "

PLOT NO. 2.

Superphosphate..	16 grains
Magnesium sulphate.....	8 "
Potassium sulphate.....	8 "

PLOT NO. 3.

Sodium nitrate.....	8 grains
Superphosphate..	16 "
Potassium sulphate.....	8 "

PLOT NO. 4.

Sodium nitrate.....	8 grains
Superphosphate..	16 "
Magnesium sulphate.....	8 "

PLOT NO. 5.

Sodium nitrate.....	8 grains
Potassium sulphate.....	8 "
Magnesium sulphate.....	8 "

PLOT NO. 6.

No fertilizer.

Celery seed was sown in Plot No. 6 April 9, '98, and plants from this plot were transplanted to the other ones on May 24, '98. On October 15 the condition of the plants were noted. In Plots Nos. 1, 2 and 4 the growth of the plants was practically the same and was much more healthy, stocky and of better color than in the remaining plots, which again were practically alike. The deductions made from these results are that the soil in question needs superphosphate and magnesium sulphate, and these two fertilizers should be applied at the rate of 300 pounds superphosphate and 150 pounds magnesium sulphate per acre.

SOIL TEST NO. 2.

This soil was sent by Mr. J. Pierpont, Burlington township, Licking county, Ohio, August 2, 1898. It was a heavy loam, and from it five plots were prepared, as described in soil test No. 1. These plots were fertilized in the following manner:

PLOT NO. 1.

Sodium nitrate.....	8 grains
Potassium sulphate.....	8 "
Superphosphate..	16 "

PLOT NO. 2.

Potassium sulphate....	8 grains
Superphosphate.....	16 "

PLOT NO. 3.

Sodium nitrate..... 8 grains
Superphosphate..... 16 "

PLOT NO. 4.

Sodium nitrate..... 8 grains
Potassium sulphate..... 8 "

PLOT NO. 5.

No fertilizer.

The plots were prepared and planted with oats August 2, 1898. Plants were up August 6. On August 18 no marked difference could be noticed in the appearance of the plots. Plots Nos. 1, 2 and 3 were probably a little better than plots 4 and 5. On August 31 Plots Nos. 1, 2 and 3 were far in advance of plots 4 and 5. The plants were larger, more vigorous and each stock had side shoots. These three plots were alike in appearance. Plots 4 and 5 were of inferior growth, had no side shoots and were again alike in appearance. From these results it will be seen that this soil needs phosphates only, and no money should be spent for nitrogen and potash.

For fall crops 300 pounds of fine bone meal, and for spring crops the same amount of superphosphate per acre should be applied. H. A. WEBER.

The Theory of Phagocytosis.

[NOTE.—Through some mistake an article which appeared in the November issue of the *Agricultural Student* upon the above subject was badly confused. We reprint the article with the proper additions and corrections.]

Bacteria are plants and not animals, as is commonly supposed. They are universally distributed; no place where the air can circulate in currents is free from them; while many of them are our friends, a large number known as pathogenic, or disease producing, are the deadliest enemies of animal life. All the so-called contagious and infectious diseases are caused by germ life.

Just how they cause disease and why in some cases a second attack does not occur has given rise to many theories.

One of the old theories, known as the theory of phagocytosis, is an interesting as well as an ingenious one. Briefly, it is as follows: In the blood are found two kinds of corpuscles, the red and white, the red being largely in excess in point of numbers, being about 300 red to one white corpuscle. The white corpuscles, known also as leucocytes or phagocytes (hence the name phagocytosis), have no definite structure, but are made up of a soft mass of protoplasm differing in no recognizable character from the unicellular amoeba. They possess the power of movement and can bore through the blood vessel wall into the lymph spaces and thus creep about among the tissues. This process is especially frequent in inflamed parts and the pus or matter from abscesses is made up largely of these white corpuscles.

These leucocytes take into their substance and digest bacteria and other noxious matters which are injurious to the animal system. Thus they act, as it were, as sanitary policemen of the body. If they are present in sufficient numbers and strength to destroy the germs no disease will result. By practice they become adept, as it were, in destroying germs and thus immunity from a second attack may result.

But this theory has been supplanted by later ones.

The germs themselves are not the direct cause of the disease which is attributed to them, but the disease is directly due to a toxic albumen which the germs manufacture. For example, a few millions of bacteria in the foot would not especially inconvenience anybody if they remain in a passive state, but let a few tetanus germs enter a traumatism or wound caused by a rusty nail, and if the conditions are favorable, they will rapidly multiply and cause a severe case of tetanus or what is commonly known as lockjaw. Now, the germs of tetanus are of the anarobic type; that is, they cannot live in the presence of oxygen, hence, when they are introduced into a wound,

they do not circulate or spread, but remain localized in the region where they were introduced. Now we know that lockjaw or tetanus affects the whole muscular system; how is this brought about if the germs remain localized? Well, the tetanus is not caused by the germs themselves, but they secrete a toxic product which is a virulent poison to the animal system; so poisonous is it that five-thousandths part of a milligram is sufficient to kill a man. This toxic product, the action of which causes the disease, is thrown into the blood and carried all over the system causing the well-known symptoms of lockjaw. When the substance comes in contact with the cells of the tissue it produces an irritating effect upon them, and they, acting under the stimulus of this irritation, secrete a chemical substance known as anti-toxine, so called because it has a neutralizing effect upon the toxins secreted by the germs.

The above is the opposite of the theory of phagocytosis, and it marks a rapid stride in the science of medicine. The theory is a very plausible one and has many facts to back it. We know from experience that the weaker organisms, whose cells would not be in a condition to secrete this neutralizing substance, succumb to disease much more readily than the robust, energetic organism.

The new cure for diphtheria which is a rousing success, and of which we read so much a few months ago, is founded upon this theory, and is prepared in the following manner: Usually a healthy horse is taken and inoculated with about five drops of toxine from diphtheria germs. After the fever subsides, say the second day, he is inoculated with about ten drops and this process is continued, gradually increasing the dose until the horse can stand about one-fourth of a pint, he is then considered immune. An artery is then tapped and a quantity of blood drawn off, after this stands for a short time, the clot will separate and leave a clear serum. This serum contains the anti-toxine which was secreted

by the cells. It is then bottled and placed on the market as anti-toxine for diphtheria. Diphtheria patients, whose bodies are so weak that the cells are unable to secrete a sufficient quantity of anti-toxine, are greatly benefited by having a quantity of this injected into the system.

Rabies or hydrophobia, or mad dog bite, as it is commonly called, is treated in much the same manner. Germs of rabies are injected into a rabbit which dies from the effects, its brain and spinal cord is taken, and put in a bottle tightly corked. After fifteen days the poison in the cord and brain becomes weaker and the patients are inoculated with this the first day, on the second they are given some from a brain and cord 14 days old, on the third day from one 13 days old and so on until they can stand the fresh poison. They are then immune. The germs of rabies have no effect on them.

This briefly is the plan on which bacteriological diseases are coming to be treated and from the present effects, we are justified in predicting wonderful results in the future.

M. I.

Will the Horse Become Extinct ?

(Address Before the Livestock Protective Association, at Springfield, O., November 19, 1898, by David S. White.)

In this age of progress, perhaps no one thing has made as rapid forward strides within the past fifty years as that of locomotion, i. e., transportation. While our ancestors were glad of an opportunity to ride to church behind a yoke of oxen, which had but one advantage over riding Shank's mare, that of keeping their feet out of the mud, we, nowadays, growl and grumble at a comfortable, plush-cushioned, electric-lighted, electric-heated and electric propelled, palatial tram car, and all because it does not rush through the crowded city streets and country highways at the reckless rate of speed attributed only to those queer vehicles in which Jules Verne paints people making imaginary journeys to the moon.

While our forefathers must needs depend upon muscle and wind to draw their land vehicles and water vessels, we have harnessed steam, compressed air and electricity, and made them submissive to our will. The American people are a nervous folk; we want, in our anxiety to "be up and doin'," to keep continually forging ahead (even our Spanish critics seem to notice this idiosyncrasy of ours); and for such a national temperament as this, the old, slow means of attaining a maximum distance in a minimum amount of time will not suffice.

For Americans, some of you may think, the horse seems too slow. And for the public service, in the transportation of the masses to and from their daily toil, and across stretches of our vast land, perhaps, the old-time one-horse chaise method is a trifle slower than is consistent with the demands of this generation. I shall not, at any rate, attempt to convince any of you here, today, to make yourselves believe that we should turn back to the days of the stage coach, or even to the mule-car-horse-omnibus period. Perhaps we were just as happy in those dear, olden times of slow transportation, but from the change that new conditions have brought with them and imposed upon us, we cannot well dovetail our affairs of today with our ideas of yesterday, any more than the proverbial square plug can be made to fit in the round hole—we can't make them fit.

If, then, the horse is too slow a means of locomotion for the public at large in this latter end of the twentieth century, is there no future for him? Is it true that before our generation shall have "gathered about it the draperies of its couch and laid down to pleasant dreams," that this noble animal, which, for so many centuries, has been so closely identified with man, shall disappear from our streets and thoroughfares, to be replaced by some auto-motor carriage? No; I do not believe it must come to this.

The tremendous falling off in the value of our horses (between \$75,000,-

000 and \$100,000,000) in the past few years, began with the adaption of the forces of electricity, compressed air and other gases, to drive the wheels of vehicles upon iron tracks. Then came the modern safety bicycle, with its cushioned tires, well advertised and pushed by enterprising manufacturers, which led to its adoption as a means of locomotion by both old and young, until a time was reached when to be possessed of a wheel was the desideratum of nearly every American heart. Young men who formerly were wont to take fair ladies out on sunny Sunday afternoons behind a hired nag, rode out with her upon a steed of steel. In the "fad" to become wheelmen, many forgot that the horse might still have uses.

A third factor which has made the horse appear in a bad commercial light was the financial stringency which, like a cloud of gloom, has been hanging overhead since 1893, and though, I am most happy to say, the silver lining of this cloud can now be seen from beneath the darkness of its veil, in many industries the convalescence has been slow, the pulse remaining long enfeebled and the heart, in too many instances, weak.

These are the principal things which have kept the horse suppressed and his value at low ebb.

What, then, is the horse's future? If my prophesy is worth anything at all, there will always be a demand, and a growing demand, for the following classes of horses:

1. As an animal for heavy draft purposes—to move heavy loads in our cities and on our farms.
2. As an animal of luxury.
3. For racing purposes.

A word in regard to each of these classes or types:

1. The heavy draft variety is a much-demanded horse for drayage of merchandise, etc., in our commercial centers. During the past two years hardly any class of horses gave as good a return for

the investment as well-matched draft teams, on the Chicago market.¹

This particular kind of equine should be large, well-muscled, of good limb, smooth in conformation and of docile temperament. The gait which the dray horse is expected to take is the walk; therefore they should be good walkers. The conformation and breeding of these animals pre-supposes *force*, rather than speed, hence they are not intended to be trotted much. However, every good draft horse should, if forced beyond a walk, be able to move off with grace and ease; head elevated and tail arched. They should, further, be free from all blemish.

Besides the heavy draft, for many business purposes, lighter express wagons, delivery wagons, etc., a lighter class of horse is in demand, a kind of so-called "general purpose" horse—a jack-of-all-trades animal, whose pedigree dates back to the time when there were few good horses in America, before importations of the better horse began, and was, at one time, especially popular with farmers. As his title indicates, his realm of usefulness was unlimited. During the week he was expected to draw the plow, harrow, do the logging for the saw-mill, and even Sunday brought him no rest. After taking a whole family, perhaps, "to meeting" in the forenoon, his afternoon time was devoted to "buggy ridin'" his master's son's best girl, and often must he stand for hours during the cold of an Arctic-like Sabbath night, with naught to eat but hitching post hay, nor drink but the snowflakes that fell upon his chilled frame, while his master's son-and-heir popped corn (and sometimes "the question") before the roaring wood-fire on the hearth within. If he got home by the wee small hours of the morning and got in in time for a square feed of oats and hay before the "hand" came to harness him again for his turn at the feed-mill, he uttered no complaint.

¹ According to F. J. Ferry, of Chicago, the best quality of heavy draft horses have doubled in price since 1895. Such horses must weigh from 1500 to 1800 pounds, "the larger the better."

When cheap, lighter horses were needed for the transportation of the masses, before the advent of our newer means of transportation, old "general purpose" brought a fair price; but now he is a drag upon the market.

His place may well be filled by a type of horse to be spoken of later.

2. The Horse for Luxury:²

Here would belong particularly the coacher, a type of horse imported to this country from England and the Continent of Europe. The typical coach horse is a large, showy animal (16 hands and upward), of good action and prompt, willing temperament. The best specimens of the coacher type come from France, where they have been bred with great care under the supervision of the government. They are especially well adapted for the heavier carriages, and as only those of us who are "rolling in affluence" can keep heavy carriages, they bring, well-matched spans, top-notch prices on the market. An hour's rest on a bench in Central Park, New York; along the drive, on a Sunday afternoon, and dozens of spans of this type of horse will pass in review before you. 'Though no extreme speed is claimed for them, and they are not being introduced for racing purposes, many of them are splendid roadsters, being able to roll a coach or break over a 12 or 14-mile stretch in an hour, and do it nicely.

I think this class of horse will grow in popularity, and as soon as they are bred from more suitable dams than at present, and better individuals produced by our farmers and breeders, they will be much more common and desired than they now are. Besides being an individual of luxury, they are well adapted for use in place of the general purpose horse. In-

² In a letter of November 12, 1898, from J. S. Cooper, of Chicago, commission salesman, I read the following: "The demand lately for coach horses with conformation and high action, has been very much in excess of the supply on the market, which, unfortunately, of that kind is always limited, and the prices, when possessed of quality, conformation and action, are higher than ever recorded in the history of the trade. The right kind will sell any day here at prices from \$250 to \$500 apiece, and in some exceptional cases far in excess of that figure."

ferior specimens, as they all have good size, can be used for many draft purposes, especially where more active, lighter animals are required.

Another class of horse that is rapidly regaining its former popularity in America, is the saddle horse. We have two general classes of saddlers, viz: the gaited and the non-gaited. The gaited saddle horse has been particularly developed in our South, where the art of riding was originally learned from the Spanish. Gaited saddlers are frequently trotting or pacing-bred horses that are especially nimble-footed, and which are able to go at different gaits, as the walk, trot, fox trot, single-foot, pace, etc., readily changing from one of these gaits to another at the suggestion of the rider.

The wheel has done more to bring the saddle horse back to us than any other factor, in that it encouraged outdoor exercises in runs over park drives and country roads; but as the "bike" became more and more common, and the price cheap, those of us who were better off turned back to the saddle horse, which gives us even better exercise than the wheel, and tests our powers of skill and management to better effect. Punctures and the long, weary walks of miles, through wind and rain, which they entail, are not so common in equestrianism—though the expense of this latter pleasure may be more excessive.

For the anglo-maniac, the non-gaited, bang-tailed saddler is in demand. This horse must show only the walk, trot and canter. Other gaits are not considered *comme il faut*. To one who has learned the art of "posting" in the saddle, a comfortable "turn" in the park may be had astride a gaitless equine. For the one, however, who would rather fall off by bumping than stay on by rising in the saddle, the trotting gait is not the ideal-of-comfort horse. On the other hand, the aforesaid anglo-maniac, whose person makes a violent angle at the waist; whose feet lie out on his horse's shoulders, and between whose legs, when he

trots, the following horseman gets really panoramic views of the landscape, this bang-tailed, Teutonic equine fulfills all purposes.

3. The light roadster—the American horse, a product of American skill and ingenuity in horse-breeding—is an animal we all cherish. The development of the American trotter is entirely the growth of a century, dating back to the importation from England to Philadelphia, in 1788, of the thoroughbred horse "Messenger." Nearly every trotter of note in the United States, whose pedigree is established, traces in one or more lines to this great horse.³

Neither time nor inaccurate knowledge will permit me to go into the details of the development of this representative American horse.

The market for this type of horse is by no means confined to track uses, and while thousands of them are annually being trained for the speed ring, a larger number are used by gentlemen for road purposes. The unfortunate fact that we have the tough hickory-wood growing in abundance in the United States, coupled with the American skill in manufacturing light-weight vehicles, has given a boom to the use of swift, lighter harness horses, of which our home-bred trotter is the very ideal. While many of our millionaires have their heavier carriages for family use, not a few keep also some speedy trotter to drive before their model, modern, rubber-tired road wagons. Heretofore breeders of this class of horse have been sacrificing everything to speed, breeding, of course, for racing purposes, but now the *tendency* is to make speed an embellishment to good size, quality, action and color, and when this is, finally, fully accomplished, the American trotting horse will be even more popular at home and abroad than now.

³ That the United States has a flourishing export trade in horses, and many of the horses exported are trotting-bred, may be inferred from the following, which I quote from Mr. Cooper's letter: "The export demand has grown to large proportions. From a small beginning in 1893, it may now be said to be in the neighborhood of

It must seem, then, that there are still many uses to which the horse is indispensable. And though each generation seems to make inroads upon his sphere of usefulness, these encroachments are more apparent than real. Over fifty years ago, when railways were being so generally introduced into our country, it was supposed that it would greatly decrease the number of horses from the consequent disuse of horse power. Yet such has not been the result; on the contrary, horses increased in number, being needed for increasing farming operations and goods transportation.

Even the threatened inundation of our land with the auto-motor carriage has only frightened the more faint-hearted breeders and dealers. A personal friend of mine, an American appointee to a congress at Paris, France, the home of the auto-mobile, tells me that not as many of them are being used today upon the streets and in the environments of Paris as there were a year or two ago. Fewer are seen at the cabstands, and those in use are generally the property of enthusiasts and inventors, and are used mainly for summer pleasure runs across the well-roaded country.

It is, as yet, extremely problematic whether, in our time at least, a means of self-propulsion will be developed to replace the horse in his present fields. The problem is too complex. It seems as if some omnipotent genius must first demonstrate to us that physical impossibility—perpetual motion—and then apply it to airships, before we can hope to see the perfectly successful and practically satisfactory auto-motor wagon. This is my prophesy. I may be a false prophet like

the one who once wrote a book to prove that a steam vessel could never cross the Atlantic. The first copy of that book to reach New York came as mail on an ocean steamer.

On the other hand, if this omnipotent genius does invent, with his omnipotence, an eminently practical, self-running vehicle, let us receive it without prejudice. We have been able to get along on this side of the briny deep since 1492 without it, and I am sure we can with it.

From the day it became apparent that a locomotive could climb a hill and go safely around a curve, and that a new means of locomotion had been really introduced, the most dismal pictures were drawn of its effect upon certain branches of industry. The breeders of horses, the drivers of stage coaches, the keepers of wayside inns and taverns, the proprietors of stage companies, the owners of turnpike stock, were all to be ruined. To the amazement of the croakers, none of these predictions came true. The same ruin was to follow when Howe first introduced the sewing machine. The poor sewing girl has seen her day, was thought. What twentieth century woman would be without her sewing machine?

While I believe in specialism to a given extent, I also believe that every man should be above his trade, calling or profession; in other words, I believe that every man should be a *man* in the broadest sense that that term implies. A man, then, should always be able to mold—remould, if necessary—himself to the conditions surrounding him, and as those of our forefathers who, when the steam locomotive replaced the stage coach, turned to other vocations for a livelihood, so will in this case the perfect, prototype American find other employment for his brain or brawn.

But, as I have said, those of us interested in the horse need have little fear that he is to become an animal extinct, for, except they be vessels upon water or

50,000 annually, and even this number is small compared with what might be if the class of horses which they demand were more numerous on the market, but they are limited in numbers and, of course, the sales to the foreign trade are in the same ratio of limit. It is well-known to dealers and the trade in general that a horse famine is almost confronting us at this moment." The export trade of 1897 took 50,000 horses, and from present indications in 1898 it will exceed 70,000. "It is increasing all the time, and calls for the best horses, and the drain has been so heavy upon the best quality that good horses are very much reduced in quality—in numbers, about three and one-half millions in the last four years.

vehicles upon tracks, auto-locomotion as applied to them, has yet many obstacles to overcome ere it reaches its acme of perfection, i. e., its GOAL.

The Relation of Agriculture to Other Industries.

In the "Official Catalogue, Guide and Program, Industrial Exposition of the Northwestern Manufacturers' Association and Ladies' Auxiliary, St. Paul, Minn., 1898," we notice the following letter from Mrs. Jennie B. D. Gribben, chairman of the committee on the "Relation of Industries to Agriculture":

"In the entire Northwest there has never been a year with more favorable harvest weather, and scarcely any that would equal the present. Consumption of farm products is a necessity of all men, wherever situated; but the farmer's welfare depends upon a demand that shall draw upon his own commodities, and in the greatest amount that he can supply. The supply is regulated by the demand, both in kinds and quantities. This plain proposition is so easily understood that it is familiar to everyone. And just here the question of a home as against a foreign market comes up. The most valuable and the most remunerative of all agricultural products are not exportable beyond the seas, and only very partially transportable to any considerable distance at home. These include potatoes, beets, turnips, cabbage, and all green vegetables raised in market gardens, all orchard products, poultry, veal, mutton, milk, berries, butter and eggs. Everyone knows that a neighborhood market for all of these articles makes the difference between the price of land in the vicinity of a city and that of the remote districts. Land yields roots by the tons, wheat and corn by the bushel. There are many localities in the state which are taking great interest in the culture of beets, and there has been some little effort to encourage the building of factories to manufacture sugar from the beets.

"How valueless the grass produced in the marsh lands has always appeared to us. Machines and processes recently developed and perfected have not only made a market for the farmers for this hitherto waste product, but manufacture from it binding twine and other cordage, bagging for covering cotton bales, attractive and durable floor matting and numerous other articles of necessity to the farm and home. We have such a factory in our own city. Some idea of the vast field it is proposed to occupy may be gathered when it is known that in this country about seventy-eight thousand five hundred tons of binding twine are annually consumed. Heretofore the raw material for this binding twine has been imported from the Philippine Islands. Now the money paid out for the raw material will go directly into the pockets of our own farmers, while the cost of the twine will be from one-third to one-half less money, yard for yard, than is now charged.

"There are other industries in our city dependent on the farmer and market gardens; a canning factory, for instance. The tomatoes are grown on lands adjacent to St. Paul, and delivered fresh from the vines to the factory. Fifty thousand cans have been packed this summer, or about one-half what they expected to do, on account of the poor crop. Then we have a great pickle factory, where cabbage, cauliflower, onions, etc., are taken by the cart load, and a linseed oil factory, which uses large quantities of flaxseed.

"When we consider the grain used for flour and other cereal foods, lumber for manufacturing of harvesters, wagons and other machinery, leather for the manufacture of leather goods, we are well satisfied that the agriculturists are much more than equal partners in the total products of our manufacturing industries. From all which we derive the proof of not only a close interdependence for their existence, but an equal pecuniary interest of the two great divisions of productive labor, and from this

economic mutuality is seen the wisdom of harmony and co-operation in policy.

BOOK REVIEWS.

Apgar's Birds of the United States—Austin C. Apgar. Illustrated. Cloth. Pp. 415. American Book Company; New York, Cincinnati and Chicago. Price \$2.00.

With the awakening of natural science in late years and the popularization of many subjects that were formerly dealt with exclusively by the scholar, has come a great number of new works upon the different branches of science. We have just received this new and valuable work upon the birds of the United States. The author is a writer of some renown, having written before upon some other branches of natural history. This work is remarkably well gotten up, and merits the consideration of teachers for use as a manual in teaching ornithology. It is clear in its statements; is unusually good in its charts and diagrams and the illustrations are quite natural, presenting the birds in characteristic positions and not with a remarkable environment of artificial decorations, as is the case in many of our avian illustrations.

In description this book is superior to many manuals in that its statements are short, limited to essential points, consisting usually of only two connected sentences, thus making it useful as a field book. It also has the advantage of being a convenient size for the pocket. Another very commendable feature of the book is its pronouncing vocabulary. Each scientific name is marked with the accent where it should be given, thus aiding the amateur in that most troublesome accomplishment, the correct pronunciation of the scientific name.

The A. O. U. Check List is followed in the nomenclature, except that the higher birds are placed first in the book. The numbers, however, are in accordance with those of the check list.

Part III is something rather new, treating of the study of birds in the field. It is arranged in such a manner that one may determine a specimen, practically speaking, without killing the bird.

Part IV treats of the "preparation of bird specimens for display or study." Skinning, stuffing, mounting, etc., are described and illustrated.

This makes quite a complete work upon birds and is very handy as a field book and ornithologist's companion.

J. F. C.

Birds That Hunt and Are Hunted—Neltje Blanchan. Illustrated. Cloth. Pp. 360. Colored plates 48. Doubleday & McClure Company; New York. Price \$2.00.

This book is the second volume of the "Popular Ornithology" series which the author has undertaken. The cordial reception which "Bird Neighbors," the first volume, has received is almost a guaranty of the success of the second, but were the second to appear without such an introduction we are convinced that it would stand upon its own merits and receive the favorable criticism that it deserves.

The introduction is by G. O. Shields (Coquina), President of the League of American Sportsmen and editor of *Recreation*. In this introduction the loftiest sentiments that appeal to the heart of the true sportsman, are expressed, and could the introduction alone be appreciated and carried home to the conscience of every man who traverses field and woodland in search of game, the mission of the book would be more than fulfilled.

In the preface the author calls attention to the rapid extermination of many of our species and appeals to the people to devise some reasonable means of stopping the ruthless slaughter of the birds.

The text of the book is divided into four parts. Part I discusses the water birds, divers, swimmers, etc. Part II, the wading birds, the marsh birds and shore birds. Part III takes up the

gallinaceous game birds, and Part IV the birds of prey. The book is well indexed, and a thorough and accurate scientific description is given of each species considered. To this technical description is appended a more or less popular discussion, describing the habits and peculiarities of the species.

The colored plates with which the book is copiously illustrated, are very good and add much to the value and attractiveness of the work.

We recommend it to students of ornithology, and for school and college libraries.

The publishers have devised a system by which this volume may be sent postpaid to any address on approval, to be paid for if satisfactory, or returned to them in case it is not wanted after examination.

A World of Green Hills—Bradford Torrey. Cloth; 16 mo.; pp. 282. Houghton, Mifflin & Co.; Boston and New York. Price \$1.25.

This is a well-written and pleasant collection of "observations on nature and human nature in the Blue Ridge," taking the reader through the hilly parts of North Carolina and Virginia. The style of the book is distinctly conversational and the reader is made to feel that he is before the writer, and that it is spoken expression that he is listening to, rather than written expression that he is reading. The "human nature" portions of the book are happily written, bringing in the dialectic peculiarities of the hill people and natives of the South, as well as their ideas on many subjects that concern people generally.

Nature is discussed from the standpoint of one who has a technical knowledge of it, but still who wishes to express himself to persons who may have an "every-day" knowledge, rather than to scientists. Long tramps through the woods, and rambles by river and pond in search of knowledge, are graphically described, and the author clearly shows that it is knowledge, always knowledge,

that he is after, whether it be concerning nature, politics or people, and he tells us many things that we may have thought of, but which have never been mentioned to us by anyone else.

The uppermost suggestion which we get from the book is that there is wisdom to be gleaned from every field. We can learn from every one and everything if we but will.

A valuable book for persons who want reading that is instructive and at the same time restful.

The Prang Standard Color—Louis Prang. A splendid collection of color plates with descriptive text, explanations, etc. Louis Prang, publisher, Boston. Price 50 cents. Postpaid 60 cents.

We have standards of weights, measurement, sound and light, but a standard of color has up to this time never existed. We cannot doubt the need of such a standard when we notice the differences that arise between persons daily in regard to color. One may be right, both, or neither may be right. Who can tell? They have no standard. There is simply a general agreement that this color shall be called red, and that blue.

This work fills this want admirably, and the colors are graded through all shades, in all 1,176 shades being presented.

For artists, printers, engravers, teachers, botanists, horticulturists, chemists, in fact all scientists who ever have any color distinctions to make this work is of the utmost importance. The color nomenclature here presented is entirely practical and handy. The plan is one of regularity and may be quickly mastered by any intelligent person.

This "standard" being the result of years of labor by specialists in color we cannot doubt its reliability and usefulness, and we wish again to recommend it to all who have anything to do with the distinction or matching of colors.



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